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Gulf of Mannar



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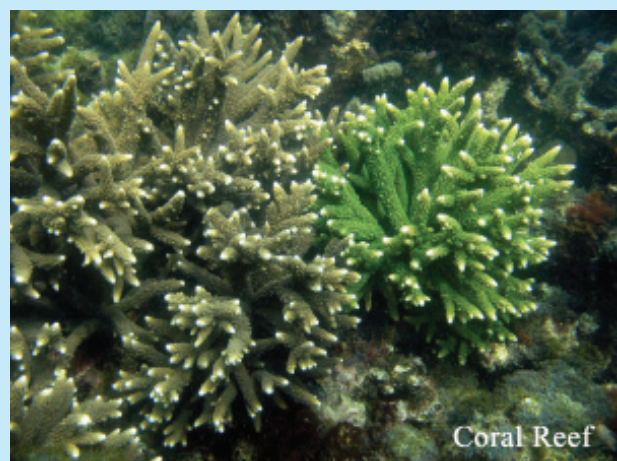
Gulf of Mannar

It is a historical fact that even before Christian era, the pearls and chanks obtained from Gulf of Mannar coast enjoyed a position among the important export commodities to various parts of the world. It is attested by the accounts of travelers like Megasthene and anonymous author of Periplus, Sangam literatures and the archaeological excavations conducted at the ancient port towns of Tamil Nadu. Not only for pearls and chanks, Gulf of Mannar is traditionally a fishing ground for the livelihood of thousands of traditional fishermen for several generations.

The Gulf of Mannar located in the southeast coast of India extends from Rameswaram Island in the north to Kanyakumari in the south. It has a chain of 21 uninhabited islands stretching from Pamban to Tuticorin covering a distance of about 140 Km along the coast. The islands occur at an average distance of 8-10 Km from the mainland. The Government of Tamil Nadu in 1986 declared the 21 islands and the surrounding shallow coastal waters covering an area of 560 Km² as “Gulf of Mannar Marine National Park” for the purpose of protecting marine wildlife and its environment. The Gulf of Mannar Marine Biosphere Reserve (GOMMBR) covering an area of 10,500 Km² between Rameswaram and Kanyakumari with long coastline of 364.9 Km running through four

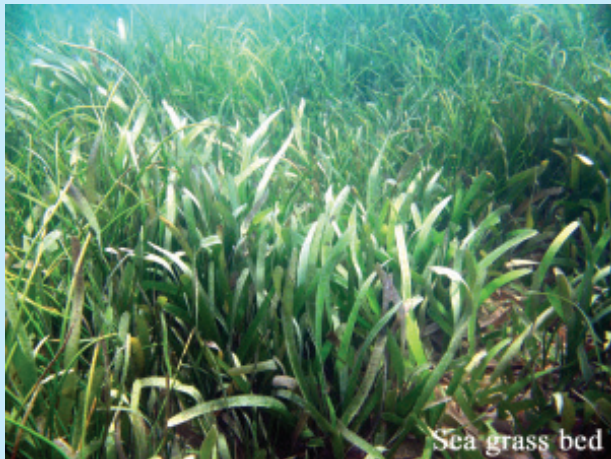
coastal districts (Ramanathapuram, Thoothukudi, Tirunelveli and Kanyakumari), was declared in 1989 by the Government of India. The GOMMBR was included under the UNESCO network of Biosphere Reserves in 2001 under Man and Biosphere Programme.

The Gulf of Mannar is one of the productive coastal regions in India with rich biodiversity. It includes key coastal habitats like coral reefs, seagrass beds, mangroves, seaweed beds, estuary, mud flats, sandy beaches, rocky shores and islands.



A total of 4,223 species of flora and fauna are so far identified from this coastal region. The coral reefs in Gulf of Mannar are one of the four major reefs (Lakshadweep, Andamans and Gulf of Kutch) in India and 117 coral species are identified. A unique endemic species of *Balanoglossus - Ptychodera fluva*, a living fossil that links invertebrates and vertebrates, has been recorded only at Krusadai. The Gulf of Mannar

is witnessing the endangered marine mammal, *Dugong dugon* (sea cow) in high numbers in Indian waters.



Though Gulf of Mannar is one of the biologically rich areas, it has been exploited beyond the limit over the past 4-5 decades. Over exploitation of marine resources, habitat destruction, pollution, and destructive fishing are the key threats. Once, Tuticorin was known for its 'oriental pearls', but unfortunately, due to destructive fishing practices this fishery has been discontinued since 1961. Often, the complex livelihood issues hamper the effective protection and conservation initiatives. The bio-invasion of *Kappaphycus alvarezii* in the reef areas is nowadays posing problem to the conservation managers. The invasion has already damaged over 2 Km² healthy reefs and associated biodiversity in Mandapam coast. Other emerging serious issues are elevated sea surface temperature due to climate change and resultant impact on the resources, in particular corals and associated biodiversity.



The enforcement coupled with various conservation measures helped to save the key resources in Gulf of Mannar, particularly in the last two decades. Corals were included under Schedule - I of the Wildlife (Protection) Act in 2001 by the Union Government and the 2004 Indian ocean tsunami made aware the fisher folk the importance of coral reefs in coastal protection. The coral mining was completely halted in Gulf of Mannar since 2005. Despite several issues, the live coral cover has increased considerably from 37% in 2005 to 42.85% in 2009 mainly due to complete halt of coral mining, reduction in human disturbance, in combination with successful reproduction and high recruitment rates. The supportive coral rehabilitation in the degraded island areas also assists in enhancing live coral cover as well natural recovery. Continued efforts have to be taken to conserve and manage the biodiversity rich Gulf of Mannar coastal region from compounded threats of direct local stress and climate change.

Bio-invasion of exotic seaweed, *Kappaphycus alvarezii* threatens coral reefs of Gulf of Mannar

The exotic seaweed, *Kappaphycus alvarezii* was introduced in Gulf of Mannar (GoM) in 2005. The *K. alvarezii* is red seaweed native to Phillipines and is an invasive species in the non-native environs of GoM. This alga spreads mainly by fragmentation (pieces of seaweed float to new locations) and can overgrow and kill coral by smothering, shading it from sunlight and abrasion. In 2008, the Tamil Nadu Forest Department along with SDMRI Reef Research Team observed the invasion in three islands of GoM viz. Shingle, Krusadai and Poomarichan, covering about 10 m² reef area. But, in 5 years, over 2.0 Km² reef area has been invaded, destroying over 800 branching and massive coral colonies and loss of associated biodiversity.

The Government of Tamil Nadu issued an order in December 2005 that *K. alvarezii* can be cultivated by Self Help Groups (SHGs) in the

seawaters North of Palk Bay and South of Tuticorin coast. The very purpose of the Government Order is to protect the key coastal habitats like coral reefs and seagrass beds and also the associated biodiversity in GoM and Palk Bay. But, the cultivation is practiced on the luxuriant seagrass beds on the South Palk Bay which is very near to coral reef areas of GoM and the algal fragments invade into reef areas.



K. alvarezii invaded branching coral colony in Gulf of Mannar

Though the Forest Department is trying to remove the exotic algae manually to save the invaded coral colonies, re-growth of the algae following their removal is also rapid due to the ability of the algae to re-grow from minute attachment points and also the low palatability of the algae to native herbivorous fishes. A regular manual removal system is essential to save all invaded coral colonies and further monitoring of affected reef areas for effective management, which is a tremendous task with high financial implications.

Coral rehabilitation for adaptation to the impacts of climate change

Coral rehabilitation is one of the viable management tools to restore the services of degraded reef areas due to climatic and non-climatic stressors. Coral rehabilitation helps to accelerate reef recovery after damage; to bypass the initial critical stages of natural recruitment and early growth; to help speedy recovery in places where natural recruitment is poor; to save coral communities or locally rare species threatened from pollutions and other local threats; to improve reef quality in biomass of live coral

cover; and to enhance the attractiveness of underwater habitat in tourism areas. It has benefits including increase of live coral cover, fisheries production, coastal defense and recreation spots.

In India, coral rehabilitation was first initiated in Tuticorin coast of Gulf of Mannar in 2002 with the support of Ministry of Environment and Forests by the Tuticorin based Suganthi Devadason Marine Research Institute (SDMRI). The researchers from SDMRI successfully standardized and field tested the low cost and low tech transplantation technique using artificial substrates like cement frames and multipurpose fish houses with native coral species (*Acropora nobilis*, *A. formosa*, *A. intermedia*, *A. cytherea*, *A. valida*, *A. humilis*, *A. corymbosa*, *Montipora divaricata*, *M. digitata*, *M. foliosa*, *Pocillopora damicornis*, *Turbinaria mesenterina*, *T. peltata*, *T. crater*, *Favia pallida*, *Favites abditta* and *Porites solida*). The selection of sites, identification of healthy native coral colonies for fragments near the rehabilitation sites, precision in fragmentation, reduction of time from fragmentation to fixation on substrates, fragment fixing position and regular monitoring are important for the success of coral rehabilitation. Coral rehabilitation is successful only if native healthy coral colonies are available. Different species of native corals need to be rehabilitated to facilitate heterogeneity in the site. Coral rehabilitation using fragments from other environmentally different locations will not be successful.



Coral rehabilitation on fish house

In Tuticorin coast, over 1 Km² degraded reef area has been rehabilitated and the overall survival was over 80%. The annual growth varied between 11.34 and 13.96 cm/year for branching corals and 1.63 to 1.80 cm/year for non branching corals. The coral recruit density increased from 0.53 to 2.55 per m²; and fish abundance increased from 34 to 65 per 100 m² in 5 years. In addition, over 4 Km² degraded reef area at various islands (Vaan, Koswari, Vilanguchalli, Kariyachalli, Krusadai and Poomarichan) and mainland has so far been rehabilitated following the transplantation technique.



Steps have to be taken not only to rehabilitate the vast degraded reef area in a phased manner in order to restore the live coral cover and its ecosystem services, but also to monitor the success for better management. Presently, coral rehabilitation in 1 Km² degraded reef area in Tuticorin coast is being carried out by SDMRI under GIZ funded project titled “Demonstration project on rehabilitation of coastal habitats - Adaptation to climate change in livelihood of

coastal people in Gulf of Mannar, Tamil Nadu, Southeast coast of India” with the association of Department of Environment, Government of Tamil Nadu.

The climate change impacts on coral reefs cause coral bleaching and mortality and lead into loss of habitat and biodiversity including migration of fishes. This will ultimately affect the artisanal fisher folk who depend on this ecosystem for livelihood. Efforts should be made with focused adaptive mechanism such as coral rehabilitation to cope up the impact of climate change and to restore the services through resilience. The identification of resilient and resistant coral species for rehabilitation is important for better adaptation and to improve the ecosystem health.



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Events

Awareness campaign on pollution free and accident free Deepavali

Deepavali a festival of lights is being celebrated by lighting fire crackers. Therefore, the Director, Department of Environment, conducted an awareness campaign on 31st October 2013 to create awareness on pollution free and accident free Deepavali. Thiru V. Thangavelu, I.A.S., (Retd.), Chairman, State Environment Impact Assessment Authority, along with



Dr. H. Malleshappa, I.F.S., Director of Environment read an oath on pollution free and accident free Deepavali and flagged off the rally. Staff of the ENVIS Centre of the Department of Environment also took part in this rally and spread awareness by distributing pamphlets.

Release of Green Guru manual

The Green Guru manual was released by the Kuruvila Jacob Initiative for Promoting Excellence in School Education and the Care Earth Trust, Chennai on 12th November 2013. The initiative was aimed at improving teaching methods by exposing the teachers to the joys of teaching through a project. Thiru Mohan Varghese Chunkath, I.A.S., Additional Chief Secretary, Environment and Forests Department, Government of Tamil Nadu launched the 'Green Guru', a resource manual on biodiversity. Dr. A. J. T. Johnsingh, former Dean, Wildlife Institute of India, who received the first copy, praised the teachers' initiative. Dr. H. Malleshappa, I.F.S., Director and Dr. Jayanthi M. I.F.S., Additional Director, Department of Environment, also participated in the event.



Inauguration of National Environment Campaign



The inauguration of the National Environment Campaign was held at C.P. Ramaswami Environmental Education Centre, Eldams road, Chennai, on 5th December 2013. Dr. Nanditha Krishna, Honorary Director, C.P. Ramaswami Aiyar Foundation welcomed the gathering and spoke on the need for the Environment Campaign. Dr. H. Malleshappa, I.F.S., Director, Department of Environment participated in the inauguration and delivered the inaugural address. The staff of the ENVIS centre also participated in this programme.

The review meeting of ENVIS part II scheme

The review meeting of the ENVIS part II scheme "Preparation of District Environment profile for Eco sensitive areas in Tamil Nadu" was conducted on 11th December 2013 at the Forest Department Conference Hall, Panagal Building, Saidapet, Chennai. Dr. Jayanthi M, I.F.S., Additional Director, Department of Environment welcomed the representatives of the various departments and informed that the environmental data is being compiled by the ENVIS centre, and data is needed from all Departments for compiling the District Environment profile for Eco sensitive areas.



International Energy conservation Day celebrations

The G.S.S. Jain College for women, Veppery, Chennai in association with the Department of Environment, Government of Tamil Nadu conducted a one day seminar on Energy conservation on 12th December 2013 to commemorate the International



Energy conservation Day. Dr. H. Malleshappa, I.F.S., Director, Department of Environment delivered the inaugural address and also inaugurated the exhibition which was put up by the Enviro club of the college. The ENVIS staff also participated in the programme and screened a shot film titled “Save our Shola Forests” and interacted with the students.



Environmental Awareness Camp for NGC teacher coordinators

At present our environment is facing many problems in the form of pollution, degradation and various forms of exploitation. The only solution to all these problems is in making the children aware of the natural resources; the cause of degradation and importance of a clean environment. Keeping this in mind the Department of Environment, Government of Tamil Nadu conducted a Training programme for the NGC teacher coordinators in all the 32 Districts of the Tamil Nadu during the months October to December 2013. Various experts



on environment from each district were invited to train the teacher coordinators so that in turn they could train the NGC students in their respective schools. The training also included screening of environmental awareness videos and also small field trips. Thiru L. Durai, NGC State coordinator and Thiru K. Muthukumar, Programme Officer, ENVIS Centre, conducted the training programmes in all the 32 districts of Tamil Nadu. The NGC teacher coordinators were also trained on soil and water testing by the ENVIS staff. Dr. H. Malleshappa, I.F.S., Director of Environment and Dr. Jayanthi M., I.F.S., Additional Director of Environment also participated in the training programme in certain districts.



Inauguration of Environmental Information Dissemination Centre (EIDC) in Chennai

Dr. H. Malleshappa, I.F.S., Director, Department of Environment, inaugurated the Environmental Information Dissemination Centre (EIDC) in Choolai, Chennai-112 on 13th December 2013. Thiru G. Thangaraj, District Coordinator, Chennai East NGC who is in charge of the EIDC, welcomed the gathering. The Director of Environment detailed the steps taken by Department for setting



up of the EIDCs. He also interacted with the teacher coordinators and reviewed the NGC activities in their respective schools. After the inauguration session, tree saplings were also distributed.



Initiatives by Government of Tamil Nadu (Forest and Environment Departments) to protect coral reefs of Gulf of Mannar

- The Gulf of Mannar Marine National Park which includes 21 islands and surrounding shallow coastal waters with an area of 560 Km² was declared in 1986. Joint patrolling by staff from Forest Department, Fisheries Department, Coast Guard etc. is being conducted to check illegal collection of protected species, including corals.
- The corals were included under Schedule - I of the Wildlife Protection Act, 1972 in 2001 to give maximum protection. The effective enforcement by the Forest Department helped to halt coral mining completely since 2005. Surprise checks are being conducted in tourist places like Rameswaram and Kanyakumari to completely stop selling of corals as souvenirs.
- The Department of Environment, Government of Tamil Nadu has prepared the detailed High Tide Line Maps and Coastal district profiles for all the coastal districts of Tamil Nadu. Strict implementation of the Coastal Regulation Zone Notification (2011) has protected the coral rich marine environments such as the Gulf of Mannar. The Department of Environment also creates awareness to the coastal communities through 'Message on Wheels' on the protection of coastal environment.
- The Gulf of Mannar Biosphere Reserve Trust (GOMBRT) was established in 2002 to implement the UNDP-GEF funded project on "Conservation and sustainable utilization of Gulf of Mannar Biosphere Reserve's coastal biodiversity", wherein coral conservation is one of the thrust areas. Since 2013 the Tamil Nadu Government has taken over the GOMBRT to continue the conservation activities to protect coral reefs and associated biodiversity.
- Grass root level community organizations - Village Marine Conservation and Eco-development Committees (VMC and EDCs) with a mandate for linking conservation and livelihood improvements have been established in 252 villages/hamlets along the 160 km coastal stretch from Rameshwar in Ramanathapuram District to Periatthalai in Tuticorin District. Capacity building of coastal community in additional livelihood options is being conducted to reduce the pressure on reef environment.



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